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Fabrication and characterization of chitosan and pectin nanostructured multilayers

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Abstract

© 2015 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim. Chitosan has been used for drug delivery applications for many years, and pectin has been recently used for several biomedical applications too. Both chitosan and pectin have shown to possess mucoadhesive properties. We report the assembly and characterization of biocompatible and biodegradable multilayers based on the layer-by-layer (LbL) deposition of chitosan and pectin. The dependence of the multilayer properties on the degree of esterification of pectin, as well as on the assembly pH, is characterized, and the mucoadhesiveness of the multilayers is estimated at oral and gastric pHs. The LbL assembly of chitosan and pectin for the fabrication of hollow capsules is carried out for the first time, and its potential use for drug delivery applications opens new prospects for the production of novel drug delivery materials. Chitosan/pectin multilayers and nanostructured capsules are developed by the layer-by-layer electrostatic self-assembly technique. The influence of the pH assembly and of the pectin degree of charge on the multilayer properties is characterized, as well as the interaction with the mucoadhesive protein mucin. The biocompatible, biodegradable, and mucoadhesive capsules are stable and can be regarded as novel drug delivery materials.

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Keywords

chitosan, dissipative quartz crystal microbalance, layer-by-layer self-assembly, mucin, pectin